Notice of Allowability	Application No.	Applicant(s)	
	10/514,413	CAMPBELL ET AL.	
	Examiner	Art Unit	
	PARAS SHAH	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *08/10/2009*.

2. ☒ The allowed claim(s) is/are *1,2,4,8,9,11,14,15,17 and 23-26*.

3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/P. S./
Examiner, Art Unit 2626

DETAILED ACTION

1. This communication is in response to the Amendments and Arguments filed on 08/10/2009. Claims 1,2,4,8, 9, 11, 14, 15, 17, and 23-26, with claims 7 and 13 being cancelled. The Applicants' amendment and remarks have been carefully considered and this case is now in condition for allowance.

2. All previous objections and rejections directed to the Applicant's disclosure and claims not discussed in this Office Action have been withdrawn by the Examiner.

EXAMINER'S AMENDMENT

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Eric Shelton on 08/14/2009.

Please **Replace Abstract** with: --" An apparatus enabling automatic determination of a portion that reliably represents a feature of a speech waveform includes: an acoustic/prosodic analysis unit calculating, from data, distribution of an energy of a prescribed frequency range of the speech waveform on a time axis, and for extracting, among various syllables of the speech waveform, a range that is generated stably, based on the distribution and the pitch of the speech waveform; cepstral analysis unit

estimating, based on the spectral distribution of the speech waveform on the time axis, a range of the speech waveform of which change is well controlled by a speaker; and a pseudo-syllabic center extracting unit extracting, as a portion of high reliability of the speech waveform, that range which has been estimated to be the stably generated range and of which change is estimated to be well controlled by the speaker."—

Please **Amend the beginning of the Specification** with the following new paragraph after the Title and before the "Technical Field" with: --"This application is the U.S. National Phase under 35 U.S.C. § 371 of International Application No. PCT/JP2003/001954, filed on February 21, 2003, which in turn claims the benefit of Japanese Application No. 2002-141390, filed on May 16, 2002, the disclosures of which Applications are incorporated by reference herein."--

Please **Amend Claim 26, 2nd line from** "said step of calculating a distribution of energy includes:" **To** --" said step of calculating a distribution of cepstral distance includes:"

Reasons for Allowance

4. Claims 1, 2, 4, 8, 9, 11, 14, 15, 17, 23-25, and 26 are allowed.

5. The following is a statement of reasons for the indication of allowable subject matter: None of the cited references either alone or in combination thereof teach the combination of elements as recited claim where for detection of syllabic regions of speech two calculations are performed. These include the acoustic/prosodic analysis

unit and the cepstral analysis unit, where the cepstral unit is further defined to include a linear prediction analysis unit, cepstral distance calculating unit which calculates... a distribution of spectral distance ...based on the estimated value of formant frequency, interframe variance calculating unit, and a reliability center candidate output unit. The pseudo-syllabic center extracting unit which determines and uses information from both outputs to determine a specific feature. For these mentioned reasons the claims are allowable over the cited prior art.

The closest prior arts of record, specifically, Bagshaw teaches determination of features using two different units, an acoustic analysis unit (see Figure 8.5, Fourier transform and peak/mid/valley point) and a cepstral analysis unit (see Figure 8.5, cepstral analysis). However, Bagshaw does not specifically teach the cepstral analysis unit including a cepstral distance calculation unit, interframe variance calculating unit and a reliability center candidate output unit as claimed.

Mizuno teaches a cepstral analysis unit calculating, based on output from said linear predicting means (see col. 6, lines 28-29, LPC cepstrum is used as a feature vector), distribution on the time axis of local variance of spectral change on the time axis of said speech waveform (see col. 6, lines 29-35, delta cepstrum is obtained from LPC cepstrums as a function of time, A(t)); and means for estimating, based on the distribution on the time axis of variance of spectral change in said speech waveform calculated by said second calculating means (see col. 6, lines 29-35, delta cepstrum is computed), a range in which change in the speech waveform is well controlled by said source (see col. 6, lines 42-60, number of peaks that exceed a threshold is determined

and compared with the sum total of a threshold to determine the speech period. However, Mizuno does not teach the use of two units in determining a feature as claimed and the cepstral analysis unit calculating a cepstral distance distribution based on an estimated value of formant frequency.

Lea teaches an acoustic/prosodic analysis unit (see Figure 1) extracting means for calculating (see Figure 1, sonorant energy filter and energy calculation), from said data, distribution of an energy of a prescribed frequency range of said speech waveform on a time axis, and for extracting, among various syllables, a first portion of said speech waveform (See page 42.7.1, Figure 1, a speech waveform is input and energy calculations are made for specific frequency ranges (prescribed frequency ranges) (sonorant energy filter and very low frequency filter)), that is generated stably by a source of said speech waveform, based on the distribution of energy and pitch of said speech waveform (see Figure 1) (e.g. From the figure, speech is input into the system. Then, energy calculation is done to determine the syllable units (voicing). Further, a stable range is determined from the boundary that is determined by pitch. (see page 42.7.1, right column, last paragraph-page 42.7.2, left column, lines 1-12)). However, Lea does not specifically teach the cepstral unit is further defined to include a linear prediction analysis unit, cepstral calculating unit, interframe variance calculating unit, and a reliability center candidate output unit.

Further, Scmidbauer teaches determining the portion representing a feature of said speech waveform based on the first portion extracted by said extracting means the second portion estimated by said estimating means (page 10.9.3, left column, 3rd full

paragraph-right column, line 18) (e.g. The cited portion discloses the syllabic nuclei boundary estimate and then extraction of stable regions of the syllabic nuclei.) However, does not teach the use of two units in determining a feature as claimed, specifically the cepstral analysis unit.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Rabiner et al. (US 3,649,765) is cited to disclose speech analyzer for extracting formants. Chow et al. (US 5,596,680) is cited to disclose detection of speech activity using cepstrum vectors. Kane et al. (US 5,630,015) is cited to disclose detection of speech, where cepstrum analysis is performed for peak detection. Abe (US 5,710,865) is cited to disclose boundary estimation for voice recognition. Hanazawa (US 2005/0165604 is cited to disclose acoustic analysis of speech.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PARAS SHAH whose telephone number is (571)270-1650. The examiner can normally be reached on MON.-THURS. 7:30a.m.-4:00p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on (571)272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David R Hudspeth/
Supervisory Patent Examiner, Art Unit 2626

/Paras Shah/
Examiner, Art Unit 2626

08/25/2009